Claims

1. An extraction device (1) for extracting objects (2), in particular clots, foreign bodies, etc., from cavities (3) in a human or animal body, with first and second compressible and expandable collecting baskets (10, 20, 102, 110) between which the object (2) can be captured, said collecting baskets being mutually displaceable and being able to be drawn one into the other, wherein at least one collecting basket (10) is umbrella-like in the expanded state and is designed with flexible wire-like adjustment elements for deliberately changing the shape and/or position of the collecting basket so that the object can be captured in the latter and can be drawn into the other collecting basket (20).

2. The extraction device (1) as claimed in claim 1, wherein the umbrella-like collecting basket opens in the direction toward the other collecting basket or in the direction away from the other collecting basket.

3. The extraction device (1) as claimed in either of the preceding claims, wherein both collecting baskets (10, 20, 102, 110) are provided with at least one adjustment element (11, 21, 100) for deliberately adjusting the shape and/or position of the collecting baskets.

4. An extraction device (1) for extracting objects (2), in particular clots, foreign bodies, etc., from cavities (3) in a human or animal body, with at least one compressible and expandable collecting basket (10, 20, 102, 110) having a distal end and a proximal end (12, 13, 22, 23, 105), wherein at least one wire-like flexible

adjustment element (11, 21, 100, 104) is secured at the distal and/or proximal end (12, 13, 22, 23, 105) in such a way that the at least one collecting basket (10, 20, 102) can be deliberately oriented by the latter and changed in shape.

5. The extraction device (1) as claimed in claim 3 or 4, wherein the at least one adjustment element (11, 21, 100, 104) has one or more thin wires.

6. The extraction device (1) as claimed in claim 3, 4 or 5, wherein the at least one adjustment element (11, 21, 100, 104) is arranged on the outside and/or inside of the at least one collecting basket (10, 20, 102), in particular at least partially integrated into the circumferential surface (29) of the collecting basket and/or laced into this.

7. The extraction device (1) as claimed in one of claims 3 through 6, wherein the at least one adjustment element (11, 21, 100, 104) protrudes beyond the outstretched length of the at least one collecting basket and is arranged to be actuated in particular from the proximal end, in particular to be actuated via a handgrip.

8. The extraction device (1) as claimed in one of claims 3 through 7, wherein, with an adjustment element (11) provided at the proximal end (12) of the collecting basket (10), the latter has an asymmetrical design, in particular lengthened on one side in the area of attachment of the adjustment element (11), and/or is provided with a hook-shaped element (75) for engagement of an adjustment and/or guide element.

9. The extraction device (1) as claimed in one of the

preceding claims, wherein the adjustment element or elements (11) are secured on the collecting basket (10) in a branched-out configuration and are brought together in groups proximally.

10. The extraction device (1) as claimed in one of the preceding claims, wherein the at least one adjustment element (11, 21) is in one piece with the collecting basket (10, 20).

11. The extraction device (1) as claimed in one of the preceding claims, wherein the distance between the distal end (12) of the collecting basket (10) and the at least one proximal point of attachment or point of emergence (18, 19) of the at least one adjustment element (11) is constant for different designs of the collecting basket.

12. The extraction device (1) as claimed in one of the preceding claims, wherein the proximal end (23) of the at least one collecting basket (20) can be fixed or is fixed in a tubular element, in particular a catheter (40), and the adjustment element or elements (21) are guided or can be guided through the tubular element.

13. The extraction device (1) as claimed in one of the preceding claims, wherein the at least one collecting basket (20) is designed so that it shortens in its longitudinal direction upon widening and lengthens when its cross section is reduced, and in particular can be expanded to a diameter (d_2), greater than the diameter (d_1) of the cavity (3) to be cleared, for partial widening of the cavity.

14. The extraction device (1) as claimed in one of claims 12 through 13, wherein a sleeve element (24) for strengthening the connection between

tubular element (40) and collecting basket (20) is provided at the proximal end (23) of the at least one collecting basket (20).

15. The extraction device (1) as claimed in one of claims 12 through 14, wherein the tubular element (40) is made in one piece with the second collecting basket (20) and is provided at least partially with a cut permitting expansion and compression.

16. The extraction device (1) as claimed in one of the preceding claims, wherein reducing elements (60, 61) arranged transversely with respect to the longitudinal extent of the at least one collecting basket (10) are provided, in particular in the area of the proximal and/or distal ends (12, 13) of the collecting basket and/or in the area of the at least one proximal point of attachment or point of emergence (18, 19) of the at least one adjustment element (11), and the reducing elements (60, 61) are in particular nooses.

17. The extraction device (1) as claimed in one of the preceding claims, wherein the adjustment element or elements (11, 21, 100, 104) are fixed or movably guided in at least one tubular element (40), in particular a catheter.

18. The extraction device (1) as claimed in one of the preceding claims, wherein a guide cannula (14, 74) is provided which is secured on the distal end (12) of the first collecting basket (10).

19. The extraction device (1) as claimed in claim 18, wherein the guide cannula (14, 74) and/or the tubular element or elements (40) is/are made of a flexible material, in particular a metal, a metal alloy, a plastic or another flexible material or a

combination of materials, in particular of nitinol.

20. The extraction device (1) as claimed in one of the preceding claims, wherein a channel element (50) is provided which has an internal diameter such that the at least one collecting basket (10, 20, 102), a guide cannula (14, 74) and/or tubular elements (40) and the adjustment element or elements (11, 21, 100, 104) can be guided through it.

21. The extraction device (1) as claimed in claim 20, wherein the channel element (50) is made of a stable and at least partially flexible material, in particular of a plastic, metal, a metal alloy, in particular nitinol, in particular a thin-walled nitinol tube.

22. The extraction device (1) as claimed in one of the preceding claims, wherein at least one collecting basket (10, 20, 110) is made of a braided fabric and/or woven fabric and/or scrim, in particular a wire braid and/or woven wire fabric and/or wire scrim and/or at least one collecting basket (10, 20, 102) is composed of a tube (90) slotted along at least part of its length and/or is provided with a coating (111).

23. The extraction device (1) as claimed in one of claims 3 through 22, wherein the at least one adjustment element (11, 21, 100, 104) is formed from a part of a braided fabric, woven fabric, scrim, or a slotted tube.

24. The extraction device (1) as claimed in claim 22 or 23, wherein the cuts (91) in the slotted tube (90) are made in such a way as to afford the maximum ratio of shortening and widening upon

expansion of the collecting basket (20).

25. The extraction device (1) as claimed in claim 24, wherein the cut or cuts (91) in the slotted tube (90) are made long in comparison to the lengthwise extent of the collecting basket.

26. The extraction device (1) as claimed in one of the preceding claims, wherein the at least one collecting basket (10, 20, 102, 110) is made of a biocompatible material, in particular a metal or a metal alloy, in particular a stainless steel or nitinol and/or the material of the at least one collecting basket (10, 20, 102, 110) is coated with a material, in particular a biocompatible surface coating, heparin, a carbonization of nitinol, a nanotechnological coating, radiopaque particles, a coating releasing active substance, an in particular microporous biotechnological or other coating.

27. The extraction device (1) as claimed in one of the preceding claims, wherein partial areas of the at least one collecting basket (20) are made of material of different diameter, in particular an expandable partial area (x) of the at least one collecting basket (20) is made of a material with a thinner cross section or has a braided fabric or scrim or woven fabric with filaments of different diameter.

28. The extraction device (1) as claimed in claim 27, wherein the material of the at least one collecting basket (20) in at least one partial area is chemically and/or mechanically treated, in particular etched, electrolytically polished, microground or otherwise treated.

29. The extraction device (1) as claimed in one of the

preceding claims, wherein a guide wire (30) and/or inner mandrel is provided along which the at least one collecting basket or the two collecting baskets (10, 20, 102, 110) can be displaced and/or can be inserted into the cavity (3).

30. The extraction device (1) as claimed in one of the preceding claims, wherein at least the second collecting basket (20) has a self-opening partial area (x) and a self-closing partial area (y), which self-closing partial area (y) can be opened deliberately by at least one adjustment element (21).

31. The extraction device (1) as claimed in one of the preceding claims, wherein the extraction device (1) can be used in conjunction with an endoscope with or without provision of the channel element (50).

32. The extraction device (1) as claimed in one of the preceding claims, wherein a means (120) is provided for cutting or separating objects (2), in particular a wire (122) provided with a material thickening, in particular a ball (121), a helical portion (124), a noose-shaped portion (125), a combination of these or some other type of material thickening, which wire (122) can be or is arranged so as to be movable inside the collecting basket, and/or a balloon catheter provided with a stent or such like element.

33. The extraction device (1) as claimed in one of the preceding claims, wherein a suction means (130) is provided for suctioning of objects or parts of objects, in particular a cannula (131) or such like tubular means which can be guided into the area of the collecting basket and can be acted on by a partial vacuum.